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EXAMINER	
CONNELLY CUSHWA, MICHELLE R	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/918,398	Applicant(s) MALSUURA ET AL.
	Examiner Michelle R. Connelly-Cushwa	Art Unit 2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3,5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

The prior art documents submitted by applicant in the Information Disclosure Statements filed on February 12, 2002 and October 24, 2002 have all been considered and made of record (note the attached copies of form PTO-1449).

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not state that the person making the oath or declaration believes the named inventor or inventors to be sole or joint inventor or inventors of the subject matter which is claimed and for which a patent is sought.

It does not identify the mailing or post office address of each inventor. A mailing or post office address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing or post office address should include the ZIP Code designation. The mailing or post office address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

It was not executed in accordance with either 37 CFR 1.66 or 1.68.

Drawings

Twelve (12) sheets of formal drawings were filed on July 31, 2001 and have been accepted by the Examiner.

Claim Objections

Claim 17 is objected to because of the following informalities: the claim contains the limitation "and includes compensation in part or in whole of said device, and includes compensation in part or in whole of the physical geometry of said photonic crystal" in lines 3-5 of claim 17. Although it is understood that the compensation is for imperfections in the photonic crystal structure after reading the specification (see page 9, line 31, through page 10, line 1 of the present application), to be clear and concise, the language of the claim must define what the compensation is for.

The Examiner suggests amending claim 17 by inserting --for imperfections in the photonic crystal structure-- after "compensation" in line 3 of claim 17, and by inserting –for imperfections—after "compensation" in line 4 of claim 17 to overcome this objection.

Specification

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5, 6/1-6/3, 6/5, 7/1-7/3, 7/5, 8/1-8/3, 8/5, 9/1-9/3, 9/5, 13/1-13/3, 13/5, 14/1-14/3, 14/5, 15/1-15/3, 15/5, 16/1, 16/2, 16/3, 16/5, 17/1-17/3, 17/5, 19-21 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Cotteverte et al. (US 2002/0048422 A1).

Regarding claims 1, 5, 19 and 23; Figures 14-18 of Cotteverte et al. disclose a photonic device (100) comprising a photonic crystal having configuring means (dimensional actuating devices, 112 and 120) fixed to the photonic crystal for effecting a change to the physical geometry in at least one region of the photonic crystal such that the propagation of light therethrough or the confinement of light therein is thereby altered (see paragraphs [0059]-[0067]).

Regarding claims 2, 3, 20 and 21; the configuring means (120, see Figure 16) disclosed by Cotteverte et al. includes an electrostrictive, piezoelectric component (see paragraphs [0064] and [0067]). The piezoelectric substrate (120) disclosed by Cotteverte et al. contracts the photonic crystal when it is actuated by applying a voltage to the piezoelectric substrate (120), thus, the piezoelectric substrate is electrostrictive.

Regarding claims 6/1, 6/2, 6/3 and 6/5; the configuring means (dimensional actuating device, 120, see Figure 18) disclosed by Cotteverte et al. provides at least one change in the respective direction of propagation of light of fixed frequency by switching light from a first output waveguide (146) to a second output waveguide (152) when the configuring means is actuated (see paragraph [0059]).

Regarding claims 7/1, 7/2, 7/3 and 7/5; the configuring means (dimensional actuating device, 120) disclosed by Cotteverte et al. provides at least one change in the

respective electromagnetic field pattern of one or more of the modes of confined light, thereby controlling the propagation of an optical signal having the one or more modes of confined light by application of a voltage and actuation of the configuring means (see paragraph [0064]).

Regarding claims 8/1, 8/2, 8/3 and 8/5; the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the respective frequency of one or more beams of light propagating through the device (see paragraph [0088]). Cotteverte et al. teaches that a wavelength division multiplexer (WDM) can be manufactured using the photonic crystal switch of the invention. WDM devices operate either to combine wavelengths of one or more different frequencies from multiple inputs and route the combined frequencies to one input or to separate wavelengths of one or more different frequencies from one input and route the separated frequencies to a plurality outputs. Thus, an input optical signal has a different frequency composition than an output optical signal for a WDM device. Therefore, at least one change occurs in the respective frequency of one or more beams of light propagating through the WDM device formed with the photonic crystal structure disclosed by Cotteverte et al.

Regarding claims 9/1, 9/2, 9/3 and 9/5; the device disclosed by Cotteverte et al., is a WDM device, including waveguides (500 and 502, see Figure 28 and paragraph [0088]), wherein the WDM device provides a change in the frequency of the beams of light propagating through the waveguides. Each beam of light traversing a waveguide includes one or more modes of light confined within the waveguide. Thus, changing the

frequency of a beam of light in a waveguide changes the frequency of the one or more modes of that beam of light in that waveguide. Therefore, the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the respective frequency of one or more modes of light confined in the device.

Regarding claims 13/1, 13/2, 13/3 and 13/5; Figures 20 and 31 discloses a photonic crystal device in which the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the spatio-temporal electric and magnetic field intensities of the optical signal propagating therethrough or confined within the photonic crystal (see paragraph [0070]), because an optical signal is electro-magnetic radiation and electromagnetic radiation is energy resulting from the acceleration of electric charge and the associated electric fields and magnetic fields, the energy involving oscillating electric and magnetic fields at right angles to each other and to the direction of propagation through space (see A Dictionary of Physics, Oxford University Press, third edition, pages 119, 120 and 229). Therefore, optical signals inherently include spatio-temporal electric and magnetic fields and controlling/changing the intensity of an optical signal inherently controls/changes the intensities of the spatio-temporal electric and magnetic fields of that optical signal.

Regarding claims 14/1, 14/2, 14/3, 14/5, 15/1, 15/2, 15/3 and 15/5; the changes to the electric and magnetic field intensities provided by the photonic crystal device disclosed in Figures 20 and 21 of Cotteverte et al., as discussed above with respect to claim 13, are a function of time. The devices include an input (172), an output (190)

and two asymmetric waveguide segments (176, 182). An optical signal is directed to the input (172), split substantially equally in the two waveguide segments (176, 182), and then recombined at the output (190). Changes in dimension perpendicular to the two waveguide segments will affect an optical signal propagating in the first waveguide segment differently than an optical signal propagating in the second waveguide segment because of the asymmetry, by delaying the optical signal in one waveguide segment so that the delayed optical signal has a desired phase at the output. The delay is a time delay that determines whether or not the two signals will be completely out of phase, in phase, or partially out of phase, which directly affects the intensity of the optical signal. Therefore, the intensities of the electric and magnetic fields of the optical signal is a function of time (see paragraph [0070]). The light beams or optical signals inherently include one or more modes of light confined within the waveguides (176, 182) of the device disclosed by Cotteverte et al. (see Figure 20).

Regarding claims 16/1, 16/2, 16/3 and 16/5; mode characteristics, including mode symmetry, are defined by the cavity dimensions (i.e., shape and size) of photonic crystals and the dielectric properties of the surrounding photonic crystal medium. The configuring means (dimensional actuation device, 112 and 120) disclosed Cotteverte et al. changes the size or shape of cavity dimensions in a photonic crystal medium. Therefore, the configuring means disclosed by Cotteverte et al. provides at least one change in the symmetry of one or more modes of light confined in the device.

Regarding claims 17/1, 17/2, 17/3 and 17/5; the configuring means (dimensional actuation device) disclosed by Cotteverte et al. is adaptive for configuration over the

whole photonic crystal device disclosed by Cotteverte et al. (see Figure 16), the dimensional actuation device providing compensation to the defects/imperfections in the photonic crystal device to control the propagation of an optical signal propagating therethrough by changing a dimension of the defects/imperfections.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 6/4, 7/4, 8/4, 9/4, 11/1-11/5, 12/1-12/5, 13/4, 14/4, 15/4, 16/4, 17/4 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cotteverte et al. (US 2002/0048422 A1).

Regarding claims 4 and 22; Cotteverte et al. discloses all of the limitations of claims 4 and 22 as applied to claims 1 and 19 above, except for specifically stating that the configuring means (dimensional actuating device) includes a magnetostrictive component of the photonic crystal. Cotteverte et al., however, does teach that other actuation techniques are compatible with the process of the present invention, including actuation techniques that incorporate magnetic material (see paragraph [0082]). Since, Cotteverte et al. teaches that the configuring means (dimensional actuating device) is a device that causes the photonic crystal to contract, one of ordinary skill in the art would have recognized that a configuring means incorporating magnetostrictive magnetic material could be used in the invention, since Cotteverte et al. suggests incorporating

magnetic material. Therefore, one of ordinary skill in the art would have found it obvious to incorporate a configuring means including a magnetostrictive component in the invention of Cotteverte et al. to dimensionally actuate the photonic crystal. Regarding claims 6/1, 6/2, 6/3 and 6/5; the configuring means (dimensional actuating device, 120, see Figure 18) disclosed by Cotteverte et al. provides at least one change in the respective direction of propagation of light of fixed frequency by switching light from a first output waveguide (146) to a second output waveguide (152) when the configuring means is actuated (see paragraph [0059]).

Regarding claim 6/4; the configuring means (dimensional actuating device, 120, see Figure 18) disclosed by Cotteverte et al. provides at least one change in the respective direction of propagation of light of fixed frequency by switching light from a first output waveguide (146) to a second output waveguide (152) when the configuring means is actuated (see paragraph [0059]).

Regarding claim 7/4; the configuring means (dimensional actuating device, 120) disclosed by Cotteverte et al. provides at least one change in the respective electromagnetic field pattern of one or more of the modes of confined light, thereby controlling the propagation of an optical signal having the one or more modes of confined light by application of a voltage and actuation of the configuring means (see paragraph [0064]).

Regarding claim 8/4; the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the respective frequency of one or more beams of light propagating through the device (see paragraph [0088]).

Cotteverte et al. teaches that a wavelength division multiplexer (WDM) can be manufactured using the photonic crystal switch of the invention. WDM devices operate either to combine wavelengths of one or more different frequencies from multiple inputs and route the combined frequencies to one input or to separate wavelengths of one or more different frequencies from one input and route the separated frequencies to a plurality outputs. Thus, an input optical signal has a different frequency composition than an output optical signal for a WDM device. Therefore, at least one change occurs in the respective frequency of one or more beams of light propagating through the WDM device formed with the photonic crystal structure disclosed by Cotteverte et al.

Regarding claim 9/4; the device disclosed by Cotteverte et al., is a WDM device, including waveguides (500 and 502, see Figure 28 and paragraph [0088]), wherein the WDM device provides a change in the frequency of the beams of light propagating through the waveguides. Each beam of light traversing a waveguide includes one or more modes of light confined within the waveguide. Thus, changing the frequency of a beam of light in a waveguide changes the frequency of the one or more modes of that beam of light in that waveguide. Therefore, the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the respective frequency of one or more modes of light confined in the device.

Regarding claims 11/1-11/5; Cotteverte et al. discloses all of the limitations of claims 11/1-11/5 as applied to claims 1-5 above, except for specifically stating that the configuring means provides at least one change in each of the respective direction and frequency of one or more beams of light propagating through the device. The

configuring means (dimensional actuation devices) disclosed by Cotteverte et al. may provide at least one change in direction of propagation of one or more beams of light, as discussed above with respect to claim 6. Additionally, the configuring means disclosed by Cotteverte et al. may provide at least one change in the frequency of one or more beams of light propagating through the device, as discussed above with respect to 8. Therefore, one of ordinary skill in the art would have recognized that both the direction of propagation of one or more beams of light and the frequency of one or more beams of light could be altered or changed with the configuring means disclosed by Cotteverte et al. Thus, one of ordinary skill in the art would have found it obvious to change both the direction of propagation of light and the frequency of light with the configuring means (dimensional actuation device) disclosed by Cotteverte et al.

Regarding claims 12/1-12/5; Cotteverte et al. discloses all of the limitations of claims 12/1-12/5 as applied to claims 1-5 above, except for specifically stating that the configuring means provides at least one change in each of the respective electromagnetic filed pattern and the frequency of one or more modes of light. The configuring means (dimensional actuation devices) disclosed by Cotteverte et al. may provide at least one change in the electromagnetic filed pattern of one or more modes of light, as discussed above with respect to claim 7. Additionally, the configuring means disclosed by Cotteverte et al. may provide at least one change in frequency of one or more modes of light, as discussed above with respect to claim 8. Therefore, one of ordinary skill in the art would have recognized that both the electromagnetic field pattern and the frequency of one or more modes of light could be altered or changed with the

configuring means disclosed by Cotteverte et al. Thus, one of ordinary skill in the art would have found it obvious to change both the electromagnetic field pattern and the frequency of one or more modes of light with the configuring means disclosed by Cotteverte et al.

Regarding claim 13/4; Figures 20 and 31 discloses a photonic crystal device in which the configuring means (dimensional actuating device) disclosed by Cotteverte et al. provides at least one change in the spatio-temporal electric and magnetic field intensities of the optical signal propagating therethrough or confined within the photonic crystal (see paragraph [0070]), because an optical signal is electro-magnetic radiation and electromagnetic radiation is energy resulting from the acceleration of electric charge and the associated electric fields and magnetic fields, the energy involving oscillating electric and magnetic fields at right angles to each other and to the direction of propagation through space (see A Dictionary of Physics, Oxford University Press, third edition, pages 119, 120 and 229). Therefore, optical signals inherently include spatio-temporal electric and magnetic fields and controlling/changing the intensity of an optical signal inherently controls/changes the intensities of the spatio-temporal electric and magnetic fields of that optical signal.

Regarding claims 14/4 and 15/4; the changes to the electric and magnetic field intensities provided by the photonic crystal device disclosed in Figures 20 and 21 of Cotteverte et al., as discussed above with respect to claim 13, are a function of time. The devices include an input (172), an output (190) and two asymmetric waveguide segments (176, 182). An optical signal is directed to the input (172), split substantially

equally in the two waveguide segments (176, 182), and then recombined at the output (190). Changes in dimension perpendicular to the two waveguide segments will affect an optical signal propagating in the first waveguide segment differently than an optical signal propagating in the second waveguide segment because of the asymmetry, by delaying the optical signal in one waveguide segment so that the delayed optical signal has a desired phase at the output. The delay is a time delay that determines whether or not the two signals will be completely out of phase, in phase, or partially out of phase, which directly affects the intensity of the optical signal. Therefore, the intensities of the electric and magnetic fields of the optical signal is a function of time (see paragraph [0070]). The light beams or optical signals inherently include one or more modes of light confined within the waveguides (176, 182) of the device disclosed by Cotteverte et al. (see Figure 20).

Regarding claims 16/4; mode characteristics, including mode symmetry, are defined by the cavity dimensions (i.e., shape and size) of photonic crystals and the dielectric properties of the surrounding photonic crystal medium. The configuring means (dimensional actuation device, 112 and 120) disclosed Cotteverte et al. changes the size or shape of cavity dimensions in a photonic crystal medium. Therefore, the configuring means disclosed by Cotteverte et al. provides at least one change in the symmetry of one or more modes of light confined in the device.

Regarding claims 17/4; the configuring means (dimensional actuation device) disclosed by Cotteverte et al. is adaptive for configuration over the whole photonic crystal device disclosed by Cotteverte et al. (see Figure 16), the dimensional actuation

device providing compensation to the defects/imperfections in the photonic crystal device to control the propagation of an optical signal propagating therethrough by changing a dimension of the defects/imperfections.

Claims 10/1-10/5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cotteverte et al. (US 2002/0048422 A1) in view of Scherer (US 2002/0167984 A1).

Regarding claims 10/1-10/5; Cotteverte et al. teaches all of the limitations of claims 10/1-10/5 as applied to claims 1-5 above, except for the configuring means providing at least one change in the non-linear response in the device for light propagating therethrough or confined therein.

Cotteverte et al. teaches that the photonic crystal structure can be used as a wavelength division multiplexer (WDM, see paragraph [0088]). Scherer teaches that WDM devices can be constructed in very compact and robust geometry and can be electrically or optically fine-tuned by injecting optically nonlinear materials into the voids of a photonic crystal. One of ordinary skill in the art would have recognized that optically nonlinear materials could be injected into the voids of the WDM photonic crystal disclosed by Cotteverte et al. in order to allow the WDM device to be both electrically and optically fine-tuned as taught by Scherer. Therefore, one of ordinary skill in the art would have found it obvious to incorporate a non-linear material in the photonic crystal disclosed by Cotteverte et al. Thus, one of ordinary skill in the art would have found it obvious to have the configuring means disclosed by Cotteverte et al. provide at least one change in a non-linear response of the device for light

propagating therein, since the configuring means would provide at least one change to the non-linear material when it is incorporated in the device.

Claims 18/1-18/5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cotteverte et al. (US 2002/0048422 A1) in view of Sobiski et al. (US 6,498,886 B1).

Regarding claims 18/1-18/5; Cotteverte et al. teaches all of the limitations of claims 18/1-18/5 as applied to claims 1-5 above, except for specifically stating that at least one output signal is measured to provide for closed or open loop control (feedback control) of the device. An input voltage signal is applied to the device to change the physical geometry of the device to obtain the desired output in the invention of Cotteverte et al.

One of ordinary skill in the art would have found it obvious to monitor the output of the device to determine whether or not the desired output was obtained, and to make necessary adjustments to the input voltage signal that is applied to the device to respectively adjust the output of the device, since it has been held that discovering an optimum value of a result effective variable involves only routing skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In this instance the control signal or the voltage signal applied to the configuring means (dimensional actuation device, 120) is the result effective variable and the actual output of the device is the end result.

Feedback control loops that measure output optical signals and provide changes to the applied input signals that affect the output signals are conventional in the art. Sobiski et al. discloses a method of adjusting an input signal (108, controller command)

to obtain a desired output signal (103, signal out), the method employing a feedback loop created by a detector (105) that measures the output signal (signal out) of the device, wherein the detector (105) sends a control signal (106) to a controller (107) and the controller (107) then adjusts an input signal (controller command, 108) in response to the control signal (105) from the detector (105), thereby creating a feedback control loop.

One of ordinary skill in the art would have found it obvious to use the method disclosed by Sobiski et al. to adjust an input signal to an optical device in order to obtain or maintain a desired value of an output signal, the method including measuring the output signal of the device disclosed by Cotteverte et al. and adjusting the applied input signal (the voltage signal) to change the physical geometry of the device, so as to provide for loop control of the device disclosed by Cotteverte et al.

Conclusion

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (703) 305-5327. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on 703-308-4819. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7724.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (703) 308-0956.

Michelle R. Connelly-Cushwa

Michelle R. Connelly-Cushwa

Patent Examiner

June 26, 2003